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ABSTRACT

This study explored the development and processes of thinking, planning, and decision making of two preservice teachers as they progressed through their teacher education program. The effects of training in the systems approach on two preservice teachers' thinking about instruction and on their actual instructional planning documents were examined. Also investigated was the relationship between these teachers' training in instructional systems design and the approaches to teaching and planning for instruction presented in the pedagogical courses of their teacher education program. Two preservice teachers enrolled in an instructional design course participated in this study. Data were collected over a 3-year period; the primary data sources were interviews, students' notes, journals, assignments, projects and lesson plans, an instructional design survey, observations of student teaching, and personal communication with the students' university supervisors. While the students' beliefs did not change drastically over the course of their teacher education program, they refined, expanded, and validated their beliefs by gaining theoretical and practical knowledge. The results of the instructional design survey indicated that both students used instructional design principles, and to some extent procedures, thereby reflecting a systems perspective on instruction. Analysis of the students' lesson plans and their execution showed that the lesson format taught by the university, the cooperating teacher's style, and the textbook materials highly influenced the way both participants designed their lessons. The lesson plans and the statements that these preservice teachers made revealed an increasingly complex but also integrated conception of the teaching-learning process. Six tables present study data. (Contains 34 references.) (AEF)

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Instructional Systems Design and Preservice Teachers' Processes of Thinking, Teaching and Planning: What Do They Learn and How Do They Change?

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Introduction

How teachers plan instruction is a topic of interest to teacher educators as well as to many instructional designers. Prescriptions for planning based upon an objectives-first, linear or rational model are still advanced in teacher preparation programs (Borko & Shavelson, 1990), and there is some indication that teachers who are knowledgeable of basic principles of instructional design do, at least in their mental planning, employ important elements of generic models (Applefield, 1992; Earle, 1992; Clemente & Martin, 1990). Other studies indicate that while experienced teachers do not seem to follow the step-by-step objectives-first approach in their thinking and planning, the components of this approach and instructional systems design models are present in the experienced teachers' processes of thinking about teaching during preactive, interactive and postactive thinking (Moallem, Driscoll, Papagiannis, & Strazulla, 1994; Moallem, 1993).

However, there is a considerable body of data that fails to support the contention that teachers actually engage in a systematic process of planning (Borko & Niles, 1987; Egeler, 1992; Sardo-Brown, 1990). Experienced teachers typically do not plan and provide instruction in accordance with the objective-first procedures taught in teacher education programs (e.g., Shavelson, 1983; Brown, 1988) and advocated in instructional design models (Gagne, 1995; Dick & Reiser, 1996; Dick & Carey, 1990). As teachers talk about their instructional planning, what is often revealed is a focus on instructional content and activities, rather than on designating objectives, determining matching instructional activities and planning congruent evaluation (Berliner, 1990; Clark & Peterson, 1986).

Some researchers have found that preservice teachers who received instructional design training approached planning in a manner which was systematic and quite consistent with ISD models and principles (Earle, 1992; Reiser, 1994). Other studies demonstrated that preservice teachers who received instructional design training used language consistent with systematic models when asked to describe the planning process (Applefield, 1992; Driscoll, Klein, & Sherman, 1994). And even though there were some differences between teachers and instructional design experts in interpretation of instructional events (there were also differences among the experts), the study of traditional principles of instructional design did result in changes in teachers' perspectives about the teaching-learning process.

While these findings are encouraging, there is insufficient evidence to determine whether preservice teachers will continue using a systematic planning approach after they have completed their study of subject matter pedagogical courses and begin their student teaching. Certainly one factor that may account for failure to apply a systems approach in planning is the degree to which preservice teachers are grounded in a systematic approach to designing instruction. Other factors that influence the planning practices of teachers include textbooks (goals), teacher manuals and other curriculum materials, physical facilities and students, including their ability, gender, social competence, self-confidence and class participation (Brophy, 1982; Shavelson & Stern, 1981). Also reported in the literature are school schedules and a variety of organizational factors such as system or school goals, principals' planning requirements, class size and grouping practices (McCutcheon, 1980; Sardo-Brown, 1988).

In addition, individual differences in teacher beliefs, educational philosophy and pedagogical training are all likely to play important roles. It should be noted that cited discrepancies between teacher planning practices and systematic instructional planning grounded in objectives-first models are paralleled by the ongoing debate within the instructional design community concerning constructivist perspectives versus traditional objectivist views on the nature of and procedures for designing effective instruction (Jonassen, 1991; Dick, 1995; Willis, 1995; Cennamo, Abell, & Chung, 1996). Challenges to objectivist ID views also find support in teacher education where the pedagogy taught over the past 10 years has increasingly moved to advocate constructivist approaches to teaching and learning (Goodman and Goodman, 1990; Brooks & Brooks, 1993; Confrey, 1990). Teachers' beliefs about learning and teaching will understandably be influenced by their methods courses, and constructivist-based approaches to

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pedagogy and instructional design do not favor an objectives-first approach to teaching and planning. Instead they advocate recursive and reflective models for planning (Willis, 1995).

Purpose of the Study

The purpose of the study was to describe the development and explore the processes of thinking, planning and decision making of two preservice teachers as they progressed through their teacher education program. The effects of training in the systems approach on two preservice teachers' thinking about instruction and on their actual instructional planning documents were examined. Also investigated was the relationship between these teachers' training in instructional systems design and the approaches to teaching and planning for instruction presented in the pedagogical courses of their teacher education program. The following questions were addressed:

- What do preservice teachers think about learners, learning and teaching and how does their thinking change over time and after receiving ISD training?
- What do preservice teachers think about instructional systems design and how does their thinking change over the course of their teacher education program?
- How do preservice teachers who are trained in ISD plan their instruction, and how do they carry it out during their student teaching?

Methodology

Setting

In this longitudinal study we tracked two preservice teachers as they proceeded through all stages of their teacher education program at the University of North Carolina at Wilmington ("UNCW"). The undergraduate teacher education program at UNCW requires students to complete a two-semester sequence course with the first course emphasizing instructional design and the second course focusing on classroom evaluation. The courses are designed to provide students with basic concepts and principles of instructional design and with the opportunity to practice a systematic approach to planning and evaluating instruction. Although major steps in generic instructional design models (namely, Gagne & Briggs, 1979 and Dick & Reiser, 1989) are used as the theoretical framework in both courses, the application of instructional design for teachers (the concept of "teachers as designers of their own courses") is being emphasized. In other words, throughout the two courses, students use a predictable sequence of generic instructional design steps to develop their instructional plans and make assessment and evaluation decisions.

The instructional design component has been a unique characteristic of the teacher education program at UNCW. The inclusion of the ISD component into the program (Earle, 1985) has not been limited to taking the above-mentioned courses. The application of instructional design skills and principles is purportedly supported by the entire program in later methods courses and in the student teaching internship. For example, instructors of the methods courses and supervisors of student teaching have students develop lesson plans before any micro-teaching or independent student teaching. The program is also designed in a way that requires the instructional design course (the first course in the two-semester sequence courses) to be a prerequisite for most of the pedagogical courses. An objectives-first orientation to developing lesson plans is also implicitly agreed upon by the methods professors. However, despite the above suggested approaches in the program, the degree to which these programmatic supports are actually maintained throughout the program is uncertain.

Participants

Two preservice teachers who were enrolled in the instructional design course (the first course in the two-semester course) taught by the primary researcher participated in this study. The students were solicited on a volunteer basis with an understanding that they would make a three-year commitment to the research project. Neither of the volunteers had received any formal training in the use of systems design approach before entering the program, although they both had completed 45 credit hours of their basic studies.

Both students (Chloe and Tammy, pseudonyms) are female, elementary education majors with no prior teaching experience and are considered traditional students. Both Chloe and Tammy took the two-semester sequence courses in instructional design and evaluation during the first year of their respective teacher education programs. Tammy took the two-semester sequence courses with the primary researcher, while Chloe took only one of the two sequence-courses with the primary researcher. Also, Chloe was supervised by the co-researcher in this study during her student teaching. Both students were considered average students with respect to their academic background and

indicated that they had chosen to be in the teacher education program due to their love for teaching. Chloe completed her program of study in a slightly different order than Tammy.

Data Collection Strategies

The study employed a naturalistic approach and used several data sources. Data were collected over the three-year period beginning Fall, 1994 and continuing through Spring, 1996. The primary data sources were: unstructured interviews; students' notes, journals, assignments, projects and lesson plans; an instructional design survey; observations of student teaching; and personal communication with students' university supervisors.

Data Analysis

Several strategies were used to analyze the data. The general strategy was to analyze each source of the data separately before triangulating different sources to derive final assertions. This approach seemed appropriate since different data required different forms of analysis to be reduced for further analysis and comparison.

The unstructured interviews, journals and other written assignments were analyzed using an open-coding approach (Strauss, 1987), which permits the categories to emerge from the data. Interviews and written assignments for each semester were read independently, and the key statements and phrases that gave expression in any way to the respondent's key ideas, beliefs and/or understanding of the learner, learning, teaching and teaching strategies, instructional planning, evaluation of instruction, or motivation were extracted. These statements were further classified by their content and were assigned a name. The categories and their related statements were then reorganized into a matrix to allow the researchers to examine each respondent's ideas and beliefs in the different semesters. The developed matrices with participants' phrases and statements were analyzed again using guiding codes derived from instructional design to further identify the participants' thoughts about instructional design principles and procedures.

Lesson plans and observation field notes were also analyzed using guiding codes derived from instructional design procedures and principles. Two lists of guiding codes were developed. One list was a summary of generic instructional systems design steps as prescribed by ISD models and taught in the instructional design sequence courses. Another list was generated based upon the major components of instructional design assuming an interactive relationship among the components. In other words, one guiding list assumed a procedural and step-by-step model for planning (See Table 1), while the other assumed interactive relationships among components without any preference for order of occurrence of each component. Recent interactive models of instructional design (Cennamo, Abell, & Chung, 1996; Willis, 1995) were used to generate the second list (See Table 2). The results of the analysis for the above-mentioned sources of data were organized into matrices that permitted detection of differences and changes in perspectives of each participant over time.

The instructional design survey was analyzed using the keywords used by Driscoll, Klein & Sherman (1994) for items: 1, 2, 6, 7, 8, 10 and 11. For items where no keywords were identified (3, 4, 5, 9, 12, 13, 14), we used the instructional design guiding codes to assign the proper keyword. Items 9 and 13 were omitted due to the ambiguity of the items and the fact that no specific keywords could be assigned to these items. We also conducted quantitative analyses similar to that of Driscoll, et al., using the following steps: First, each participant's response was judged either "not relevant" = 0, "relevant" = 1" or "very relevant" = 2 by each researcher separately. We judged the response as being "very relevant" if the participant used all of the identified keywords in her response; as "relevant" when part of the keywords were used or the keyword was implied; and "not relevant" when no keyword was used and/or the response did not address instructional design principles and procedures. Secondly, we compared our scores and upon agreement on each item, total scores were used to compare participants' responses with each other and over time.

Results

What do preservice teachers think about learners, learning and teaching and how does their thinking change over time and after receiving ISD training?

Chloe's Beliefs and Dispositions: (See Table 3) By the end of her student teaching seminar at the beginning of Fall 1995, Chloe's concern for classroom management issues is quite apparent. She had formulated a specific set of strategies that concentrate on classroom management and she was eager to implement some of these strategies during her student teaching. Chloe's early belief statements about making learning a fun activity for students and her desire to meet students' needs carried over into her student teaching. Chloe also states a strong belief and desire to

incorporate whole language and cooperative learning methods, as well as to collaborate with parents. Although Chloe's elaborated thinking about teaching and learning point to the impact of the content of her education courses, her philosophy statements do not change materially. She uses many of the same terms and phrases that she had used at the beginning of the program to describe her beliefs about teaching and learning.

Tammy's Beliefs and Dispositions: (See Table 4) Tammy's entry beliefs and dispositions about learners, learning and teaching seem to be influenced by what she learned from her education courses. Tammy's entry concerns for differences among learners focuses most of her attention on distinguishing characteristics presented by her learners and relatively little analysis of how to teach her students. Her recall of personal early childhood experiences and her sensivity to the issue of discipline also seem to have been heightened by what she learned from the Individualized Instruction course. It seems that Tammy began her student teaching with strong beliefs about the importance of learners' individual differences, the value of an open classroom organization and a a personal preference for a somewhat laizzez faire classroom management approach and a flexible teaching style. Again, as in Chloe's case,Tammy's exit belief statements about learners, learning and teaching seem to be very similar to her entry belief statements; however, they have become more definite and specific and now appear to be expressed with the conviction of internalized personal knowledge instead of merely a set of abstract belief statements.

What do preservice teachers think about ISD? and How has their thinking changed over the course of their teacher education program? (See Tables 5 and 6)

Twelve questions were used for analysis (items 9 and 13 were eliminated) with a maximum possible score of 24, or 2 per question. Tammy scored 19 at the end of the fall semester prior to student teaching and 18 at the end of spring following her student teaching, missing only one item. Chloe's overall score was lower than Tammy. She scored 17 at the end of Fall and 13 at the end of Spring missing two items at the end of Fall and 4 items at the end of spring. When we used the items and the scoring procedures (1 point for each correct item) that Driscoll and her colleagues (1994) used to score the participants in their study, Tammy scored 7 (out of possible 7) and Chloe scored 5, missing items 6 and 11 at the end of Fall and items 7 and 11 at the end of Spring. A closer examination of survey items and the identified keywords showed an emphasis on motivation issues in the survey (3 items were devoted to motivation). Since other sources of data indicated that Tammy had a stronger concern for students' motivation, this emphasis could have masked other instructional design principles. After eliminating items related to motivation (items 5 and 10), Tammy scored 16 (out of a possible score of 20) at the end of Fall and 15 at the end of Spring. Chloe's scores were 13 and 9 respectively. Thus Tammy's responses remained relatively more consistent with ISD principles than did Chloe's.

A qualitative analysis of the participants' responses to the statements revealed more meaningful explanations. Statement 7 and 12 emphasized the concept of "objectives" and the importance of informing learners of the learning expectations. Both Tammy's and Chloe's responses were relevant to the statement 7 and very relevant to statement 12 at the end of Fall 1994. In their responses to item 7, both Tammy and Chloe clearly indicated that the teacher should have informed students of her expectations although neither of them used the term "objective." Chloe's response to the item 12 includes the term objective, but Tammy still does not use this term. However, both participants expressed clear thinking about objectives in this item.

Comparison of each participant's responses at the end of Fall and Spring indicates a change. While Chloe's responses to items 7 and 12 are relevant and very relevant to the key concept at the end of Fall, her responses to the same items were judged to be irrelevant at the end of Spring. At the end of Spring, Chloe failed to indicate objectives as the main cause for the problem expressed in statement 7. Instead she pointed to the importance of providing an outline or summary of the content at the beginning of the lesson. She also seemed to follow the same trend of thought for item 12. Examining other sources of data provides a possible explanation for this change. First, Chloe began taking her methods courses which had more emphasis on the content of the lesson than its objectives. Secondly, Chloe's assignments for the assessment course (the second course in the two-sequence course in ISD) showed that Chloe was instructed to use her beliefs and classroom instruction as references for making assessment decisions instead of using objectives as a reference for determining assessment strategies.

As indicated above, Tammy's response for item 7 and 12 are relevant at the end of Fall, although she does not use the term objective. Her responses to the same items change from Fall to the Spring semester. At the end of Spring, Tammy clearly uses the term objective for item 7, which indicates stronger thought about ISD, but her response to item 12 is somewhat similar to Chloe's response. In her response she refers to the importance of communicating content outline instead of objectives, but she also indicates the importance of assessing students' learning during the lesson. Tammy's emphasis on the term objective at the end of Spring could be due to her

continuing use of the concept of objectives for making assessment decisions. Tammy's concentration on assessing students' is consistent with the focus of instruction in her assessment course.

Items 3 and 6 in the survey were targeted toward the concept of alignment between tests or assessment strategies and objectives. Chloe's response to item at the end of the Fall does not indicate the importance of the congruency between test items and objectives. But she points to the alignment between and testing in item 3. At the end of Spring, however, Chloe's responses are more relevant to both items, in each case indicating alignment between concepts taught and testing. This change could be due to the more elaborated discussion and information that she received on the assessment of instruction during Spring,1995.

Tammy's responses to items 3 and 6 at the end of the Fall address the problem of alignment between instruction and testing although she does not specifically point to objectives. At the end of Spring, Tammy not only points to the alignment problem but she also questions the process of construction of the test items. Again, the change in Tammy's knowledge could be due to the assessment of instruction course she had taken in Spring.

Statements 2 and 11 addressed the principle of practice and feedback. Tammy's responses to these items were appropriate in both semesters. Chloe's response to item 2 is very relevant to the principles, but her response to item 11 is irrelevant in both semesters. Chloe's response to item 11 seemed to focus on the first part of the problem statement ("All she ever does is lecture") and as a result tended to see lack of variety of teaching methods as the probable cause of the problem.

Statement 1 in the survey targeted one of the important principles in instructional design: prerequisites and remediation. Both Tammy and Chloe addressed the importance of the prerequisite knowledge in their responses at the end of Fall. Chloe's response at the end of Spring was similar to her response in the Fall; however, Tammy's response was slightly different. Tammy mentioned both prerequisites and remediation at the end of Fall but only mentioned remediation at the end of Spring. It should also be noted that Tammy and Chloe differed in their perception of prerequisite knowledge. Tammy seemed to emphasize the assessment of the previous lesson as a prerequisite for the new lesson, while Chloe saw the assessment of the prerequisite knowledge as a part of the procedure in the new lesson. Although this difference does not seem to be important with respect to instructional design procedures, it may indicate the difficulty of separating pre- and posts-lesson evaluation in instructional design models. The difference between Tammy's and Chloe's responses to this item could also be due to differences in their perception of teaching. As it was indicated in the previous section, Tammy is more in favor of a flexible approach to teaching, while Chloe seems to favor a more structured approach to teaching. Therefore, evaluation of the effectiveness of the previous lesson is more important for Tammy. Chloe, on the other hand, places importance upon the structure of each lesson and values beginning each lesson with assessment of the prior knowledge.

Statements 4 and 8 required the participants to indicate the principle of example and demonstration or explanation. Taking into account the ambiguity of the statements for these concepts, we considered both Tammy's and Chloe's responses to these items relevant at the end of Fall. Tammy's responses were still relevant at the end of Spring, but Chloe's response for item 8 was very general and did not seem to be relevant to the concepts.

Finally, statements 5, 10, 13 targeted the principle of motivation and relevancy of the information. Tammy's responses to all three items were very relevant for both semesters. Given Tammy's sensitivity to the motivation issue and her strong beliefs about the importance of motivation in learning, her " very relevant" response to these items was predictable. Chloe's responses were also relevant but were not as elaborate and specific as Tammy's responses were. Given the fact that motivation is one of the major concerns for a preservice teacher, the participants' relevant responses may not have been due solely to instructional design training that they received.

How do preservice teachers who are trained in ISD plan instruction in their education courses and during their student teaching?

In order to answer the above questions we analyzed the lesson plans that Tammy and Chloe developed for their instructional design course, their tutoring tasks, their micro-teaching tasks and their student teaching.

The first lesson plan that both Tammy and Chloe developed was in their ID course in which they used Gagne and Briggs' (1979) nine events of instruction as the framework for creating their lessons. Lesson plans began with a five component objective, a list of proper conditions for learning and then prescriptions for each event followed by a brief rationale. The objective, instructional strategies or conditions for learning and assessment strategies were aligned. Both students received a high mark for their first lesson plan. Since the lesson plan was part of a required assignment in the instructional design course (the first course in the two-semester-course sequence), both participants followed instructional design procedures and principles.

The next set of lesson plans was developed during the time that Tammy and Chloe were assigned to tutor a child. Chloe's lesson plans for her tutoring sessions were developed during Spring 1995 (the same semester in which she was taking some of her methods courses). Tammy completed her lesson plans during Fall 1995; and she,too, was taking methods courses. The lesson plan for each tutoring session was developed on a predesigned form which was slightly different for different subject matter (e.g., math and literacy). For example, in the literacy form, each tutor must identify the "observed strengths" of the tutee, goals of the session (lesson), activities and resource materials for observations. At the bottom of the form each tutor also completed the section labeled "reflections and connections." The predesigned form for a mathematics lesson plan is more detailed and asks for: objectives (from NC standard course of study), teaching strategies, student strategies, session evaluation, implications for the next lesson, lesson resources, manipulatives and student reaction.

Analysis of both Chloe's and Tammy's lesson plans for tutoring sessions showed that they wrote observable objectives, identified the tutee's prerequisite knowledge, and planned an activity for the stated objective. In the literacy lesson plan (since no place on the form was devoted to assessment (testing strategies), they did not indicate how they would assess their student's learning outcomes. However, some of both Chloe's and Tammy's reflection notes point to the strategies that each had used to assess the tutee's learning (e.g., "Clair was able to remember the pieces of the story"; "Clair read a story today. She was able to do it by herself. She only got hung up on a few words."). As indicated above, mathematics lesson plans were more detailed. In addition to objectives and teaching strategies, evaluation of each session was to be recorded (although not adequately explained in the example below). As noted on the lesson form, the state standards were to be recorded as the lesson objectives. Therefore, neither participant generated her own objective for their math lesson. Rather they adapted objectives from the list of state standards. The following is an example of such a mathematics lesson plan.

Objective(s): The child will recognize patterns by playing tic-tac-toe and checkers (from NC state standards).
Teaching strategies: I will explain one game at a time to Clair and then as we play I will point out strategies for her to use allowing her to win so that she can see the patterns and learn what to look for.
Students' activities: Student will play tic-tac-toe and checkers in order to develop pattern.
Session evaluation: The child did not comprehend how to play tic-tac-toe. She did do well at checkers and could understand . . .forward pattern movement.
Implications for next lesson: I want to try tic-tac-toe again, but blocking off the board as follows. .

The third set of lesson plans was developed during the student teaching internship. Both teachers used a lesson planning format known as the North Carolina Six Point Lesson Plan. The elements of this lesson planning guide are derived from Madelyn Hunter's direct instruction model for planning and teaching (1982) and include the following steps: 1) Focus and Review, 2) Statement of Objective, 3) Teacher Input, 4) Guided Practice, 5) Independent Practice and 6) Closure. Students learned this lesson planning model in methods courses after first acquiring some facility with Gagne and Briggs' (1979) nine events of instruction. All student teachers are required to prepare and submit their lesson plans to their cooperating teacher for review before execution of their lessons. University supervisors review current and past lesson plans during their observation visits. Analysis of Chloe's and Tammy's lesson plans during their student teaching reveals that they did not always use their own objectives for their lessons. Interview data with each participant and the university supervisors also confirmed that the state standards and the teacher handbook were the main sources of objectives, although teaching strategies for lessons delivered during student teaching were largely the unique creation of each participant.

In Tammy's case, the school system in which she student taught had adopted a highly structured set of programmed materials for elementary mathematics. Therefore, she had to follow the prespecified objectives, teaching strategies, resource materials, tests and quizzes when developing lesson plans. Tammy had very little freedom to incorporate her own ideas or strategies into her lesson plans. Moreover, Tammy's lesson plans were expected to conform to those of her cooperating teacher, which in turn were mainly reproduced from the teacher handbook. Of course, there were a few lessons in which she generated her own objectives by integrating them with the prespecified objectives of the textbook or teacher's handbook. In her responses to questions about one of these independently created lessons, she indicated that she had thought about the objectives of the lesson and designed her teaching strategies by concentrating on students' interests and involvement in the activities. However, interview data with Tammy's supervisor also revealed that the lesson plans that Tammy developed integrating her own goals and objectives into the state goals tended to misjudge her students' current level of understanding. According to her

supervisor,"She had a hard time designing a lesson at the students' level. She either designed too easy or too complex activities for her lessons."

Analysis of Chloe's lesson plans reveals lesson objectives that are stated with little precision, as revealed by this supervisor's comment, "It would be good to have more precision in your objectives and to make a distinction between the learning activity and the intended objective of your lesson." The performance or behavioral indicator of the intended learning is seldom specified; and not coincidentally, the degree of congruence between instructional activities and objective(s) is often overly general. There is some indication that Chloe equates participation with learning. Her overriding goal is to have students involved and through involvment, motivated. While such a goal is certainly defensible and more than that, desirable, it sometimes appeared that the relationship between intended learning and the learning activity was of secondary importance.

Nonetheless, this student demonstrated considerable teaching competence as reflected by her very high evaluations that consistently praised the quality of student engagement, her enthusiastic delivery, skillfully led discussions, effective questioning practices, good lesson pacing and her use of meaningful reflective comments. This preservice teacher quite adeptly achieved her stated goal(s) as a teacher as expressed in her educational philosophy paper. In Chloe's words,

> "As a teacher, it is important for me to individualize instruction and make the learning experience a meaningful process to all students." " It is also important for me to properly assess my students' abilities." " For my students to grow intellectually, they need to feel comfortable with their surroundings and take risks." "My job is to find activities which will motivate students to pay attention, stay involved and work together. The whole language philosophy allows the children to learn in a meaningful way and not become bored with worksheets. In my classroom, students will be given ownership of their work, explore their surroundings and know they are valued as indivduals. This is my goal as teacher."

Discussion

Both Chloe and Tammy came to the teacher education program with a set of beliefs about learners, learning and teaching. While it seemed that Tammy's and Chloe's beliefs did not change dramatically over the course of their two-year teacher education program, they refined, expanded and validated their beliefs by gaining theoretical and practical knowledge. Both applied certain concepts learned in the instructional design sequence courses, but they tended to emphasize different concepts and principles, ones that were more consistent with their entry beliefs. For example, Chloe seemed to develop a stronger belief in pre-planning and structure for her classroom. She used the concept of learner analysis and students' prior knowledge to improve her planning. Chloe also seemed to think more about how to teach and how to put theories into practice. In her writing assignment, Chloe tended to discuss methodological issues at the practical rather than theoretical level. This more analytical approach helped her develop strategies for her future practice.

Tammy, on the other hand, focused on such concepts as "who is a learner," "what is the learner's role in the learning process" and "how a learner learns". She seemed to develop a stronger belief in the concept of "otherness" and the importance of each learner's motivation in learning. And in contrast to Chloe, Tammy's thinking seemed to remain more at the theoretical level, failing to make a transition to developing specific strategies for her own teaching practice. Thus for Tammy, although most of her written assignments and tasks were theoretically sound, it was not clear whether or not she had thought about how she would actually implement her ideas and plans for teaching.

The results of the instructional design survey indicated that both Tammy and Chloe used instructional design principles, and to some extent procedures, thereby reflecting a systems perspective on instruction. Tammy's and Chloe's responses to the survey statements were very similar to those of instructional designers in Driscoll, et al.'s study (1994). A small decline in consistency of responses with principles of instructional design was detected for both participants at the end of Spring semester. Both participants also tended to give wordier, and in some cases, more elaborate responses; but the content of their responses was less related to an ISD perspective. Chloe's explanations showed more decline in her application of instructional design principles and concepts than did Tammy's. One possible explanation is that the level of exposure to the instructional design language decreased as each participant progressed to her methods courses. Since Chloe was taking more methods courses during Spring (Tammy was still registered in core courses), this decline would be more noticeable in her responses at the end of Spring. A related and more substantive factor is the absence of continued practice in a systems approach to planning

instruction in their methods courses. Still another reason might be students' increased concern and appropriately intensive focus in methods courses on exactly how to teach various subject matter disciplines.

Obviously, Tammy and Chloe learned from the instructional design sequence courses, but the planning and teaching schemata that they constructed are not the same. The concepts, knowledge, planning procedures and teaching strategies that they most relied upon do in fact differ. Observations of Tammy's and Chloe's practice teaching and review of their lesson plans reveal differences in their planning and teaching behavior.

Analysis of Chloe's and Tammy's lesson plans and their execution showed that the lesson format taught by the university, the cooperating teacher's style, and the textbook materials highly influenced the way both participants designed their lessons. It seemed that by following the specified format prescribed by the state and university, both Chloe and Tammy developed a routine in their thinking about designing instruction. Several components of instructional design were still part of their thought process (although not always written) when they designed their lessons and executed them. These components were the objectives of the lesson, instructional strategies to enable students to reach the lesson objective, and motivational strategies. They gave little attention to precisely specifying their objectives, nor was there evidence of an interest in achieving a clear alignment of type of learning with the objective of the lesson or congruence among objective(s), lesson strategy and assessment strategy.

Furthermore, the lesson plans and the statements that these preservice teachers make as they proceed through the teacher preparation program reveal an increasingly complex but also integrated conception of the teaching-learning process. There is a heightened sensitivity to the environmental demands of teaching, specifically time and resource constraints, the physical characteristics of classrooms and the array of problematic student behaviors, academic, social and emotional. Coupled with deeper appreciation of these realities is an emerging ability to integrate the multifaceted elements of teaching that reflects the necessity for teachers to plan for the varied challenges of teaching captive but often reluctant learners.

For example, in Chole's third interview she says, "I think that I really have to focus on how to teach so that everybody is on the same level, where some students are not going to be left behind." "... I have to make some adjustments in my teaching methods to reach them." So first of all what I did was, I thought of a certain activity that would grab their attention because I knew that what my lesson plan was going to be on was to teach them 2-digit addition. How was I supposed to make that fun? How was I supposed to get them active in learning, ... that's why I started with [money] ... for the motivation, and then I ... broke it up as far as how I was going to get them to stay involved with the lesson."

And in response to the reality of special needs youngsters Chloe comments, "... now that they're mainstreaming they're bringing in all of these students that would have never been in the regular classroom." "...I'm going to be held accountable for their education ... so I have to make different adaptations in my teaching in order to teach them." "... the students are very important; the lesson is also important but I have to make it right for the students so they can learn." [Chloe did her student teaching in a full inclusion classroom where 25% of her students were officially classified as having a special need.]

The model for planning that emerges is one that recognizes the importance of the ecology of the classroom and thus requires that in the design of instruction teachers give considerable attention to arranging instruction in accordance with the physical and social dynamics of classrooms and the characteristics of learners in groups. It also incorporates the reality of students' widely divergent social, cultural, attitudinal and learning characteristics. Both teachers are drawn to accentuate the differences among learners. In their minds, the individual learner's needs are of paramount importance. Consequently, their planning mirrors this attention to the unique needs of individual learners.

In view of the patterns of behavior and thinking displayed by teacher interns in this study, it seems reasonable to suggest that applications of instructional design for teachers be carefully modified to achieve models that better account for the ecology of the classroom environment. It is essential that teachers have a robust framework for planning that meaningfully incorporates present day concerns for the widely diverse characteristics of students. Today's public school classrooms are comprised of youngsters who challenge teachers enormously. Instructional design models for teachers must address the significant motivational and learning challenges that are common to K-12 students.

ID models must also acknowledge the natural tendency of teachers to move quickly in their mental planning to selecting activities that will grab their students' attention, imagination and interest. Finally, it is important that ID models more effectively incorporate principles of constructivist views of the teaching-learning process if they are to achieve the promise of having significant utility for improving the planning, teaching and evaluation roles of

teachers. More flexible models for planning instruction as proposed by Willis (1995) may in fact better capture the process that many, if not most teachers come to use as practitioners.

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Table 1. Guiding Codes Based on Systematic Model of Instructional Design

Guiding Codes Using Instructional Design Principles and Procedures
• Thinks about the learners' characteristics and the learning environment before attempting to do planning of instruction. • Determines content to be covered simultaneously or before writing goals and objectives • Writes clear objectives that incorporate learner needs and expectations • Determines assessment strategies before thinking of teaching strategies • Divides a complex task into smaller, achievable learning units and subunits in terms of primacy of events • Decides on teaching strategies after considering objectives and conditions of learning • Plans an environment that is conducive to learning objective • Plans instructional strategies that motivate the learner (gain attention, relevancy of the task, immediate feedback, building confidence) • Plans an assessment strategy that is congruent with the learning objective

Table 2. Guiding Codes Based on Recursivee Instructional Design Models

Guiding Codes Using Recursive Instructional Design Principles

- Focuses on the learner and learner's needs throughout the design, development and implementation
- Focuses on outcomes of instruction (objectives/goals)
- Determines content (what topics to cover)
- Focuses on task to be taught and sequence of the task to be taught and the materials, facilities to be used
- Elaborates on instructional description/strategies using Gagne's condition of learning
- Demonstrates congruence between goals/objectives and instructional description/strategies and assessment methods
- Demonstrates evaluation of instruction as well as students' learning outcomes both during and after instruction
- There is a consistency between beliefs about learning and teaching, and the instructional strategies selected

Table 3. Chloe's Beliefs and Dispositions at Different Points in the Teacher Education Program

At beginning of Fall 1994	Fall 1994	Spring 1995	Before Student Teaching
". . . good teaching is when students are doing activities. . . ." ". . .a good teacher is the one who makes things fun for students. . . ." ". . . teaching is hard but rewarding. . . I always reflect back to my years in school. It was never motivating. For example I never wanted to learn geography. I want to make things rich and exciting for students because it wasn't like that for me. . . ." ". . . I see myself as a mentor, counselor and friend, teaching my students about their capabilities. This is the goal that I hope to accomplish."	". . . lesson plans should be completed before the first day of the class. . . ." ". . . I will tell my students the first day about classroom rules and the consequences of breaking them. . ." ". . .students need to be taught from the beginning what is expected of them. . . I would assign easy tasks and activities at the beginning of the school. . . I will be specific in telling students what is acceptable and what is not. . . " ". . . while preparing my lessons, I must keep two important considerations: (1) the skills and concepts they must learn, and (2) through which activities they can best learn them. . . " ". . . I must provide lessons that are broken down into steps, provide practice and encourage them. . . "	". . . I picked the metaphor of "keeper of the garden" for my teaching philosophy, because it is important to guide my students like a gardner who tends to flowers and takes out the weeds. . . ". . . I need to know about students' prerequisite knowledge. I need this information to know on what level to begin. I also need to learn about students' interests. . . I gather information about students during planning. . . I use information collected to plan activities. . . I use information about students' interests to monitor students' involvement. . ."	". . . this is an excellent strategy to use with young children because they cannot retain a large amount of information at one time. By breaking down the story into parts, the students were able to focus on smaller pieces of information. . . " ". . .I believe my job is to supply the needs of my students. . . classroom management is also critical in students' learning. I need to post rules and consequences. . . I also believe in cooperative work with parents. . . ." "When I am in my student teaching classroom, I really want to implement fun writing activities for students, maybe getting more books on Native Americans. . . I really want to try portfolios with my kids. . . " I think behavioral management is the area that I might want to provide help to my cooperative teacher in order to implement what I know. . .

Table 4. Tammy's Beliefs and Dispositions at Different Poins During Teacher Education Program

At beginning of Fall 1994	Fall 1994	Spring 1995	Before Student Teaching
". . .Teaching is making someone else's life a little fuller by providing them with the know-how to be successful. . . I don't want to expect too little but at the same time I don't want to expect too much of my students because it is easy for kids to get frustrated. . . I see myself as a teacher who would get down to the floor with kids either in groups or as individuals. . . . I would like to look at my students from their level so as to understand them better, but I would also see them as intensively smart. . ." ". . .My fifth grade teacher was very positive. She never yelled at you, she always helped you out . . . She wasn't so serious, she wouldn't mind jumping around or just having fun . . . At the middle grade when I got a good grade, they would tell me that I got it because of my father. . . when I was in elementary school, I had some friends who were LD or else they were mentally retarded and I remember that I was their only friends. Nobody else would be friends with them . . . I used to be teased by other kids because of being friends with special kids. . . I was a tomboy and used to be teased a lot because of that, so I became really shy and quiet and either played with my brother and his friend or with guys at school	". . . I wasn't raised in the states, but a lot of students agree that it's okay to have corporal punishment in the classroom. I don't think it is.. ." There are a lot of contradictions in 200 for me. . . I learned a lot from behavioral management. It showed me that I don't want to be a behavior management teacher. . . Ms... is a good teacher, she really thinks about her students and asks herself the question "How will this affect them?". . . When choosing activities for my classroom, I will choose those that I feel are relevant to learning and encourage the type of learning outcome I am looking for. . . I will do a lot of demonstrating, questioning and talking students through problems. . . . My greatest strength would be sympathy toward others, an appreciation of their differences, an ability to imagine their "otherness". . We think we learn best when we are in the position to make sense of things. . . ". . . I would arrange activities that would build logically upon each other providing prerequisite for future activities. . . I would give students strategies that they can use individually to help them make sense of the materials. . .	". . . A good teacher is the one who is humble, a role model, reflective and uses techniques and principles of attention and making materials relevant and meaningful. . . I want to be known for motivating students and helping them to achieve. . . I feel that teaching humanity and respect for themselves and others is of equal value. . . Without attention, teachers will not teach students anything. . . I would use hands-on and explorative learning strategies. . .	". . . There is much more to teaching than textbook. . . Learning needs to be explorative in nature as well as fun and meaningful. . . Learning is surfing life. It means learning includes all types of learning and subjects yet is specific in nature. . .

Table 5. Tammy's Responses to the ISD Survey

Survey Items	End of Fall 1994	End of Spring 1995
1."I can't believe we're starting something different when I don't even understand what we just did. *(target response: Remediation and/ or prerequisites)*	In this case the teacher could have asked if there were any questions as she/he moved through the lesson so as to clear up anything that wasn't understood. She also could have given them some kind of work that she would need to have checked for their understanding.	After the teacher had completed the lesson she/he should have asked if anyone needed further explanation and either provided it on a one to one basis or in the whole class setting
2. "I turned in my answers to the homework problems he gave us, but I never found out how I did." *(Target response: Feedback for the practice)*	This teacher needs to provide feedback. He could do this on an individual basis or correct the papers and hand them back.	The teacher needs to return the homework so that students get feedback. They also need to be told how they did so they can judge their own understanding of the topic. The teacher could have made their homework available to them by handing it back or letting them know they could look at it.
3. "I guess I blew that one. More than half the questions were on a topic the teacher barely touched on in class." *(Target response: Alignment between test items/assessment strategies and objectives)*	If so much of the test was going to be based on topics not covered in class, then the teacher should have let the class know that they needed to really study that and ask any questions they had about it, or she could have just had one or two questions on that topic.	When making the test out the teacher needs to refer back to her lesson plans and make sure she covered all the material that she wants to ask questions about. She could also let the student know in advance if the test is going to come from class discussion or textbook readings.
4. "Even after looking at my notes, I still couldn't do the homework problems." *(Target response: Example and/or Explanation or demonstration)*	The teacher probably needs to be more organized and more explicit. In her lessons she should have provided many examples and non-examples for the students to refer to.	The teacher needs to make sure she has completely explained the lesson in an orderly fashion, not straying off the main point so as to confuse the students. She also needs to make sure the students understand the lesson before they go do homework.
5. "I really liked this last unit. I wish we could do more on it." *(Target response: Motivation and /or Students' interest)*	The teacher needs to provide for further learning. Maybe give some enhancing retention assignments or give the student some extra work (depending on age).	Have a learning center available for the students, and the teacher needs to let students know when and how they can do some self exploration if the subject interests them.
6. "Boy, those questions were awfully tricky. They really didn't get at what I know." *(Target response: Conditions of the objective, testing)*	The teacher needs to be more precise, not trying to trick the student. He/she also needs to present the material and provide practice in a way as not to confuse or trick students when it comes to the test. The test should be similar to in-class activities.	The teacher needs to focus on what has been taught, not on trying to trick the students. Her questions need to be direct and well stated. To avoid this she could have one or two people pre-read her test before she gave it to the class, or use it as a sample test the previous year.
7. "I wonder what we're supposed to be learning from this chapter." *(Target response: objectives)*	At the beginning of the lesson the teacher needs to inform the learner of what is to be covered in this chapter and what the student will be able to do and know when they are finished.	At the beginning of the unit the teacher could state what his/her objectives are and explain briefly what the chapter is about and why it is relevant information.

Table 5 continues. Tammy's Responses to the ISD Survey

Survey Items	End of Fall 1994	End of Spring 1995
8. "She asked us to do those problems but never told us how to do them." *(Target response: Information and/or Examples)*	The teacher needs to show students how to work problems, providing examples and nonexamples, answering questions and maybe working through one of the problems before asking students to do them on their own.	If she is testing for prior knowledge then she needs to let her class know by stating that, "this is a pre-test, just do what you can." But if she is giving this as an assignment then she needs to teach the material beforehand and have the students practice the kind of problem before they go to do it on their own.
9. "I don't know how I'm supposed to understand this. Everybody else seems to know something that I don't."	Eliminated	Eliminated
10. "I have no idea why we are studying this topic. It doesn't seem to have anything to do with what I'm interested in." *(Target response: motivation)*	The teacher needs to inform the learner of the relevance of the information, making the student aware of what is being covered, how it will affect them and why.	The teacher needs to explain the relevance the topic has in the future for her students. She/he also needs to make the material meaningful by providing examples and non-examples to the students.
11. "All she ever does is lecture. We never get a chance to do anything before we're tested on it." *(Target response: Practice and feedback)*	The teacher needs to give the students a chance to practice what they are learning and then provide feedback on how they are doing. She also needs to ask the students if they have any questions or things they don't understand.	The teacher needs to provide time for practice! She also needs to make sure that the students understand what is being practiced by having class discussions and some assignments to do. She cannot expect the students to do well if they have never practiced what is being taught.
12. "He talks and he talks and he talks, and we have no idea what we're supposed to be learning!" *(Target response: Objective)*	This teacher needs to be more explicit, stay on task and inform the students as to what they re going to be learning and what the outcome of the lesson will be.	He needs to focus on his topic and not get off on a tangent. He could make an outline or list of points for himself to follow. He also needs to check with his students for understanding by asking them questions and vise versa.
13. "This is so boring. I just don't like this stuff!"	Eliminated	Eliminated
14. "I wish the teacher would spend more time with me so I could understand this stuff before we move on." *(Target response: Individualized instruction)*	This teacher either needs to cover the material more clearly, making sure that students are left without misunderstandings, or she/he needs to make themselves available to the student for extra help.	The teacher needs to make herself/himself available to those students who need extra help. She/he could do this by having weekly 5 minute conferences with each student or using a portfolio in order for students to address their needs then make sure she/he helps each one either individually or as a small group before they move on. By doing this she will provide a firmer background for them.

Table 6. Chloe's Responses to the ISD Survey

Survey Items	End of Fall 1994	End of Spring 1995
1."I can't believe we're starting something different when I don't even understand what we just did. *(target response: Remediation and/ or prerequisites)*	The teacher didn't introduce the objective and why it was important. If he/she would have done this and also tied the new objective in, the transition may have been easier for this student.	Basically, this teacher did not listen to her students. This reminds me of a teacher who is more interested in covering so much material, that she is not interested in student understanding.
2. "I turned in my answers to the homework problems he gave us, but I never found out how I did." *(Target response: Feedback for the practice)*	This teacher lacked to give students immediate feedback, which is crucial to student learning. As teachers, we expect homework to be turned in by a certain date and we should also be expected to grade papers and return them as soon as possible.	This response is coming from a student who wants to know how well they performed on their homework problems, and is now frustrated that they haven't been returned. This has major implications on learning because it's very difficult to "unlearn" something that is being repeated by students.
3. "I guess I blew that one. More than half the questions were on a topic the teacher barely touched on in class." *(Target response: Alignment between test items/assessment strategies and objectives)*	The teacher failed to test what she/he taught. Tests aren't given to trick students, but to reveal what has been taught to students.	. This teacher needed to take a course in EDN 302! Tests are not meant to trick students but to assess what they learned in class. The test should also be set up so the students perform the material the same way they learned it in class. Example: In class students demonstrate how to solve a problem. The test should also have students demonstrate how to solve the problem.
4. "Even after looking at my notes, I still couldn't do the homework problems." *(Target response: Example and/or Explanation or demonstration)*	This teacher should have given problems that were as difficult as those done in class. Homework problems are given so they practice what they've learned.	The teacher needs to develop several strategies on how to teach this subject. It's obvious that this student still cannot solve the homework problems with the lecture from the teacher. Changes in instruction need to be made.
5. "I really liked this last unit. I wish we could do more on it." *(Target response: Motivation and /or Students' interest)*	This teacher probably made this particular unit fun and interesting. This should be a cue that students want to be motivated to learn.	This is a perfect opportunity for a teacher! She can find out this student's interests and motivate this student to learn more about this unit. She can support this student's learning by supplying a variety of books about the particular unit.
6. "Boy, those questions were awfully tricky. They really didn't get at what I know." *(Target response: Conditions of the objective, testing)*	This teacher tried to trick students with the types of questions he/she gave or the wording was ambiguous	This teacher did not make a test that correlated with the concepts taught in class. As a teacher, I need to emphasize certain points that I feel are important, so students won't react to a test the same way this student did. This teacher also failed to review those concepts that would be found on the test. Tests are not meant to be tricky.

Table 6 continues. Chloe's Responses to the ISD Survey

Survey Items	End of Fall 1994	End of Spring 1995
7. "I wonder what we're supposed to be learning from this chapter." *(Target response: objectives)*	The teacher didn't properly introduce the lesson and why they were expected to learn it.	This teacher failed to make an introductory statement that summed up all the concepts of the chapter and why they were important. Children need to know why they are doing certain things, or problems could occur.
8. "She asked us to do those problems but never told us how to do them." *(Target response: Information and/or Examples)*	This teacher failed to thoroughly explain and demonstrate in class how to solve the problems. She needs to spend more time giving examples and non-examples	This teacher failed to teach children how to solve these problems. This student will feel less motivated to learn and probably feels frustrated because of what this teacher did. This also shows there is a lack of communication between the teacher and her students.
9. "I don't know how I'm supposed to understand this. Everybody else seems to know something that I don't."	Eliminated	Eliminated
10. "I have no idea why we are studying this topic. It doesn't seem to have anything to do with what I'm interested in." *(Target response: motivation)*	The teacher should mention why they were learning this topic and also tell the student that not everything in school may appeal to all students.	This teacher failed to acknowledge her students' interests, which is a great motivator. The teacher could have made an interest sheet or asked her students about those subjects they really enjoy learning about. This works as a great thematic unit.
11. "All she ever does is lecture. We never get a chance to do anything before we're tested on it." *(Target response: Practice and feedback)*	Unfortunately, this teacher is having all the attention focused on her. She needs to allow these students to have fun exploring different topics using manipulatives.	This is a traditional teacher who is basically talking throughout the whole day. Unfortunately, her students are bored and don't want to listen anymore. She needs to get her students more active and involved in their learning. Once this occurs, she will be amazed at the results. Her students
12. "He talks and he talks and he talks, and we have no idea what we're supposed to be learning!" *(Target response: Objective)*	This teacher is just rambling and doesn't have clear objectives for his students. Students need to be told what they are learning and why.	This teacher is not organized as a teacher. He needs to focus his lesson on certain topics and involve the student with the types of questions he asks.
13. "This is so boring. I just don't like this stuff!"	Eliminated	Eliminated
14. "I wish the teacher would spend more time with me so I could understand this stuff before we move on." *(Target response: Individualized instruction)*	This teacher hasn't noticed the needs of her students. This could be done while checking papers and also talking with the student.	Teachers need to set aside a specified amount of time where she can interact individually with her students. The discussion could cover a wide variety of subjects or projects they might be currently working on.